

REMARKS/ARGUMENTS

Reexamination of the captioned application is respectfully requested.

A. SUMMARY OF THIS AMENDMENT

By the current amendment, Applicants basically:

1. Amend claims 1, 2, 8 and 9.
2. Add new dependent claims 14 and 15, dependent upon independent claims 1 and 8, respectively.
3. Add new dependent claims 16 and 17, dependent upon independent claims 1 and 8, respectively.
4. Respectfully traverse all prior art rejections.

B. PATENTABILITY OF THE CLAIMS

Claims 1, 2, 4, 7-9 and 13 stand rejected under 35 USC 103(a) as being unpatentable over the admitted state of the prior art in view of U.S. Patent 6,229,211 to Kawanoue et al. Claims 3 and 10 stand rejected under 35 USC 103(a) as being unpatentable over the admitted state of the prior art in view of U.S. Patent 6,229,211 to Kawanoue et al as applied to claims 1, 2, 4, 7-9 and 13 and further in view of U.S. Patent 6,284,649 to Miyamoto. Claims 5-6 and 11-12 stand rejected under 35 USC 103(a) as being unpatentable over the admitted state of the prior art in view of U.S. Patent 6,229,211 to Kawanoue et al as applied to claims 1, 2, 4, 7-9 and 13, and further in view of the Wang et al Electroless article. All prior art rejections are respectfully traversed for at least the following reasons.

Independent claims 1 and 8 have been amended to specify that the element composition ratio (N/Ta) of nitrogen to tantalum contained in the barrier metal film is $1.0 \leq \text{N/Ta} \leq 1.5$. Dependent claims 2 and 9 have been amended to recite the ratio as $1.3 \leq$

$N/Ta \leq 1.5$. These amendments are supported, e.g., by pages 9 – 10 of the specification and particularly by Fig. 2.

Fig. 2 shows that when $1.0 \leq N/Ta \leq 1.5$, the film thickness of the native oxide (TaOx) can be 1 nm or thinner. See, also, the paragraph bridging pages 9 and 10. Controlling the film thickness of the native oxide to be 1 nm or thinner is now the subject of new dependent claims 14 and 15.

Fig. 2 further shows that when $1.3 \leq N/Ta \leq 1.5$, the film thickness of the native oxide (TaOx) can be 0.5 nm or thinner. Controlling the film thickness of the native oxide to be 0.5 nm or thinner is now the subject of new dependent claims 16 and 17.

Thus, as shown in Fig. 2, the film thickness of native oxide film (TaOx) can be thinner by 1 nm by controlling the N/Ta ratio from 1.0 to 1.5, and even better, by controlling the N/Ta ratio from 1.3 to 1.5, the native oxide film less than 0.5 nm can be obtained. Thus, by controlling the N/Ta ratio, the growth of the TaOx film is suppressed, which can restrain the development of voids in the barrier layer.

Kawanoue does not address the importance of Applicants' N/Ta ratio ranges, and certainly fails to recognize that thickness of a native oxide can be controlled in the manner accomplished by Applicants.

C. MISCELLANEOUS

In view of the foregoing and other considerations, all claims are deemed in condition for allowance. A formal indication of allowability is earnestly solicited.

The Commissioner is authorized to charge the undersigned's deposit account #14-1140 in whatever amount is necessary for entry of these papers and the continued pendency of the captioned application.

Should the Examiner feel that an interview with the undersigned would facilitate allowance of this application, the Examiner is encouraged to contact the undersigned.

Respectfully submitted,

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